

APPLESNAILS (*POMACEA*) IN U.S. WATERS

Robert G. Howells – December 2000

INTRODUCTION: Applesnails and their relatives (family Ampullariidae) are native to Central and South America, South Florida, and some Caribbean Islands (three or four genera), Africa (four genera), and Southeast Asia (one genus). Among these, only American genera *Pomacea* (true applesnails) and *Marisa* (giant ram-shorn snail) have been of major interest in the U.S. Florida applesnail (*P. paludosa*) is native to Florida, South American spike-top (*P. bridgesi*) and channeled (*P. canaliculata*) applesnails have been introduced into U.S. waters, as has giant rams-horn snail (*Marisa cornuarietis*).



Channeled Applesnail (*Pomacea canaliculata*) above and right



DESCRIPTION: Typical applesnails are globular in shape. Some species reach 102-152 mm shell height (4-6"). Normal coloration typically includes bands of brown, black, and yellowish-tan, and color patterns are extremely variable. Albino and gold (xanthic) forms occur. All have an operculum (trap door).

COMMON NAMES: Applesnails sold in the aquarium trade are usually offered under the name mystery snail (although true mysterysnails are a related, but different family). Color morphs are often sold as golden or albino mystery snails (regardless of *Pomacea* species). A few dealers selling very large channeled applesnails, and possibly other larger South American taxa, call them "giant Peruvian or South American applesnails." When channeled applesnails were introduced into the Philippines, they were called golden applesnails. The term "golden" referred to their perceived value as an agricultural crop for human consumption and not to their color. This term still persists in agricultural references. Florida, spike-top, and channeled applesnails are the common names followed by the American Fisheries Society.

DISTRIBUTION: Florida applesnail has been introduced in Alabama, but intolerance to cold temperatures restricts it from becoming established further north. Spike-top applesnail is native to Brazil and tropical South America; it has been introduced and is established in Florida, but likewise, is not sufficiently cold tolerant to expand northward. Channeled applesnail occurs from Brazil south to Argentina. It is established in California, Florida, and Texas, and was reported from North Carolina. In the 1980s, channeled applesnail was introduced in the Philippines and Southeast Asia; it was released in Hawaii in 1989.

BIOLOGY:

Applesnails feed on many types of vegetation, including terrestrial plants. Although they have gills, they can also breathe when foraging out of water. Channeled applesnail is an especially aggressive feeder and can cause extensive damage to both crops and aquatic habitat. Florida applesnail also consumes aquatic plants, but has not been implicated in crop damage to date. Spike-top applesnails prefers rotting vegetation and softer aquatic plants; it may attack larger, heavier plants only when there is no other food. None is especially good at controlling algae. Channeled applesnail introductions in the Philippines, Asia, Japan, Vietnam, Indonesia, and Hawaii dramatically impact rice and taro (elephant-ear) crops.



Channeled Applesnail
Pomacea canaliculata
operculum not shown

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COLOR VARIATION IN APPLESNAILS:

Applesnail coloration varies greatly. Brown, black, and tan banded wild-types show an array of banding patterns. Gold variants are known in spike-top and channeled applesnails and albinos may occur as well. The shell and animal itself may be different colors. A dark wild-type shell may contain an animal that is either dark or light colored. A form called “blue” has a white or translucent shell and a dark bodied animal. Remember, golden is not a species, but is a color variety of several species.



Normal and gold variants of
spike-top applesnail (*Pomacea bridgesi*)



Normal and gold variants of
channeled applesnail (*Pomacea canaliculata*)



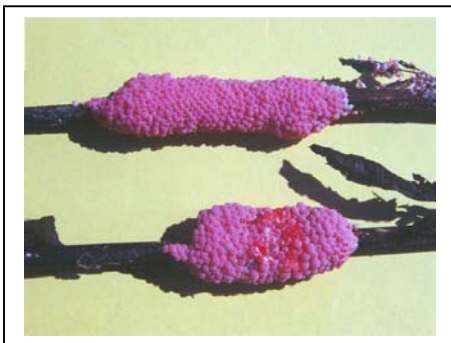
Color pattern variation in
spike-top applesnail (*Pomacea bridgesi*)



Color pattern variation in
channeled applesnail (*Pomacea canaliculata*)

APPLESNAIL EGGS:

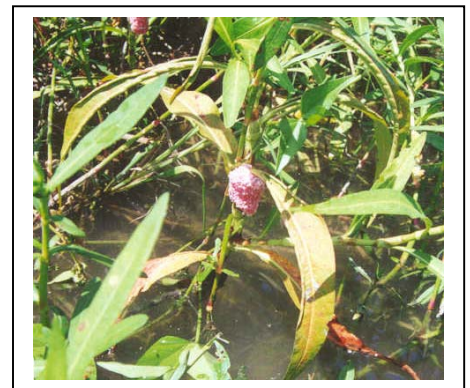
Applesnails (*Pomacea* spp.) lay egg masses on solid objects above the water line. Channeled, spike-top, and Florida applesnails produce egg masses that are initially red to pink in color and 25-102 mm (1-4”) in length. Eggs are most brightly colored when first deposited, but fade to pale pink and sometimes white over time. Incubation often takes two to four weeks. Even after eggs have hatched, remains of the egg mass may persist for extended periods. The presence of egg masses is a good clue to the presence of applesnails even when adults are difficult to observe.



Egg mass (close up view)



Egg masses on concrete drainage structure.



Egg masses on natural vegetation.

WHERE APPLESNAILS MAY BE ENCOUNTERED:

Aquarium and Pet Trade: During the early years of the aquarium trade, true mysterysnails (*Viviparus*, *Cipangopaludina*) were among the larger snail species offered by dealers. However, these species were not especially tolerant of warm temperatures required by tropical aquarium fishes. Florida applesnail was soon sold as well, but readily consumed aquarium plants. Spike-top, channeled, and occasionally other applesnails also appeared in pet stores. Spike-top applesnail became more popular because it was less destructive to aquarium plants than other applesnails. This popularity expanded when gold and albino variants were developed for sale. The name “mystery snail” was applied to warmth-loving applesnails as they replaced true mysterysnails. Today, spike-top applesnail (still sold as mystery snail) is probably the most frequently sold snail species in the aquarium trade. However, channeled applesnails seem to be appearing in dealer’s tanks with increasing frequency and other species are occasionally available. Internet sources also offer applesnails through mail order.

Ornamental Water Gardens: Applesnails may be sold by dealers specializing in goldfish, koi, and water lilies for outdoor ponds, but Japanese mysterysnail (*Cipangopaludina japonicus*) and Chinese mysterysnail (*C. chinensis malleata*) are more frequently offered (often as Japanese livebearing snails, Japanese black snails, and *Viviparus malleatus*).

Human Consumption: So far there is little indication that any of the applesnail species are sold for human consumption in North America; however, they are reportedly sold in Hawaii and elsewhere in the world as escargot. However, the increase in ethnic fish markets in some areas of the U.S. has resulted in many novel “seafood” items now being offered for sale.

Feral Specimens: Aside from locations in Florida, California, Texas, North Carolina, and Alabama where exotic species of applesnails have been previously reported, deliberately and accidentally released specimens can be expected almost anywhere in the U.S. Established populations, especially in the southern U.S. and in agricultural and ecologically-sensitive areas, are particularly important and should be reported to state or federal fisheries or agriculture agencies.

Educational Uses and Biological Supply Houses: Applesnails are often available from biological supply houses for classroom use. Species of applesnails being listed for sale are often not specified and many educators are unaware of the potential threat these animals can pose if they escape or are released.



Florida Applesnail
Pomacea paludosa

GIANT RAMS-HORN AND TRUE MYSTERYSNAILS:

Giant rams-horn snail (*Marisa cornuarietis*) is in the same family as applesnails, but has a shell that coils like a ram’s horn (discoidal). It is native to northern South America. It reaches a diameter of about 38 mm (1.5”). Its color pattern is typically yellowish-tan, brown, and black banded, but also occurs in gold, blonde, and albino variants, or may be completely dark. Unlike applesnails, it rarely leaves the water to feed and lays eggs in gelatinous masses under water that resemble frog eggs. It too has been imported and sold in the pet trade, with subsequent releases in Florida and Texas (San Marcos, Comal, and upper San Antonio rivers). Texas populations have defoliated critical habitat in headwater spring areas that support several endangered species like Texas wild rice and fountain darter. Because of this, giant rams-horn snail is legally prohibited in Texas and cannot be possessed or sold.



Giant Rams-horn Snail (*Marisa cornuarietis*)

True mysterysnails include species in the U.S., Europe, and Asia and are in the family Viviparidae. All have higher spires (are more cone-shaped) than applesnails. All have opercula. Unlike applesnails, mysterysnails do not lay eggs, but produce live young. Chinese and Japanese mysterysnails are often available through water garden dealers and have been widely released at sites around the country, though rarely with reports of significant ecological impacts. American species of mysterysnails (*Campeloma* and *Viviparus*) are similar, but often somewhat smaller. Some species may show spiral banding patterns. American mysterysnails are rarely offered for sale commercially.



Chinese Mysterysnail **Banded Mysterysnail**
Cipangopaludina chinensis malleata *Viviparus georgianus*